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steam which are condensed near the surface of the rock and the condensed water collects in small pools from which it flows in a small stream. The hot springs at the lower levels may be genuine streams of water flowing from great depths, but it is inconceivable that they should originate in one connected body or stream of water.

Tourists who camp in the Park are called "sagebrushers," and if you wish to excite the indignation of a "sagebrusher" talk to him about Yellowstone Park bears! One or two bears feeding at each hotel garbage dump would be sufficient for tourists; but at present bears congregate at the various hotel garbage dumps to the number of fifteen or twenty at a time, and the cleaning out of sagebrushers' camps by marauding bears is a nightly occurrence. The one all-absorbing topic of conversation among sagebrushers is marauding bears; and it is by no means a joke, for three or four sagebrushers are killed nearly every summer in attempting to drive bears out of their camps! The Yellowstone Park bears are an unmitigated and intolerable nuisance, and nine tenths of them should be killed at once. The only alternative is for the Park authorities to establish a vigilant all-night watch around every camping ground.

One of the points of interest at Mammoth Hot Springs is a grotto, a cavity in the hot-springs formation, and tourists are taken into this grotto in parties of twenty or thirty at a time. Only one hundred yards or so from the grotto is an opening through which carbon dioxide issues, filling a small depression at the bottom of which two or three dead birds are usually seen. If a crevice should be opened up from the grotto to any of the old hot-water channels, the grotto would in all probability be filled with carbon dioxide, and the next party of tourists would be left at the bottom of the grotto like the birds in the little valley near by. It would be wise on the part of the park management to provide for a test of the air of the grotto every morning during the tourist season. If this is not done a disaster is likely to occur at any time.

At Mammoth Hot Springs Hotel I wished

to purchase a number of large colored views and I naturally went to the "official photographer of the park." The next day, however, I found a better grade of pictures for sale at an outside place and at a cheaper price, and to my disgust I found that the colored views I had purchased from the official photographer were of foreign manufacture, whereas the cheaper and better ones which were sold by the unofficial photographer were of American manufacture! Surely the position of official photographer should be done away with in the Yellowstone Park. Very certainly it is not right for the public to be led by the term "official photographer" to purchase foreign-made colored views which are more expensive than American-made views and at the same time distinctly inferior.

Any one who has traveled through the region to the south and east of the Yellowstone Park must realize what a splendid game preserve we could have if the Yellowstone Park were extended to the east so as to include the Absaroka Mountains and to the south so as to include Jackson's Hole and Teton Mountains and Gros Ventre Mountains. The private holdings of land in Jackson's Hole could be purchased for a very moderate sum and the entire surrounding mountain region is already included in the National Forest Reserves. It would be a very easy matter for the national government to greatly extend the boundaries of the Yellowstone Park and create what would be perhaps the most magnificent asylum for wild animals in the whole world.

W. S. FRANKLIN

ALLEGHANY VALLEY EROSION

TO THE EDITOR OF SCIENCE: In the recent issue of the *Bulletin* of the Geological Society of America, Vol. XXIII., p. 295, is the paper of G. F. Wright on "Postglacial Erosion and Oxidation." In the summary of the discussion which followed, the reporter states that Mr. Leverett offered as disproof of the conclusions of Professor Wright the "great erosion in the upper Alleghany region which occurred between the deposition of the old drift and of the young or Wisconsin drift."

Here is a general statement that there is an "old" and a "young" drift in the "upper Alleghany region," and that a "great erosion" occurred between their deposition. The generality of the statement would lead one to infer that the erosion was general throughout the region, and that this fact was generally received, as well as that there was such a distinction between the "old" and "young" drifts that they could be readily differentiated everywhere by physical characteristics.

In discussing this statement we must first ascertain what Mr. Leverett considers "the upper Alleghany region," as the river is a long one. Happily we have in the map compiled by Mr. Alden for the Geological Survey a very plain demarkation of areas variously estimated by Mr. Leverett. In the above discussion he uses the term "old" drift, referring to the first or Kansan advance. Combining this statement with the areas of the map we arrive at the conclusion that the uppermost portions of the Alleghany region to which he can possibly refer begin in the immediate vicinity of Warren, Pennsylvania, which is about 100 miles from the source of the river, as above that place the river is marked as flowing through areas not reached by Kansan ice. The terms Kansan and Wisconsin are used to define alleged earlier and later phases of glaciation separated by a long interval. We will, therefore, discuss the conditions of this system from Warren southward; but as there is no method of estimating where Mr. Leverett's term "upper" ends, we will continue our discussion to and below Parker, which is half way between Warren and Pittsburgh.

After Lewis and Wright published the volume of the Second Geological Survey of Pennsylvania delimiting the "terminal moraine," Carll, in his report of the Warren region, called attention about thirty-five years ago to the preglacial channel of the Conewango now deeply buried throughout in drift which rose near Kane and flowed westward through Sheffield, Clarendon, Stoneham and Glade, between which place and Warren it crossed the present channel of the Alleghany

and flowed north into the St. Lawrence drainage system. On the northern bank of this stream and over 100 feet above its present level is a remnant of Mr. Leverett's "old drift." Between the time of its deposition and the excavation of the wide valley to present level he imagines that a long period has elapsed, and this excavation is his "great erosion." At Clarendon is more of his "old drift," also at Franklin; also at Parker. Bradford, being above Warren, is in the unglaciated area. The distances apart of these places are: Bradford to Warren (along the valley lines), 60 miles; Warren to Franklin, 60 miles; Franklin to Parker, 35 miles; Kittanning is about 25 miles below Parker. These distances enable us to employ the rule which obtains in geology as well as geometry, that when a number of points in a line or plane sufficiently distant from one another have been referred to a given datum plane, the portion of the line or plane included between those points has also been referred to the same plane. The datum plane in this case is the present drainage level of the Alleghany, and to it we will refer both the underlying rock bottom and the "old drift" of Mr. Leverett.

Our data for reference exist abundantly, as the region had been pierced from surface to great depths by tens of thousands of oil wells whose sections have been recorded, and many have been published. These wells are found in numbers on the "old drift," the "young drift," the mountain tops, the swamps and the river beds, and where rock was not near the surface a pipe was driven through the loose deposits till rock was struck. These "drive-pipe" records show the materials passed through, and form a valuable and conclusive array of facts beyond the possibility of cavil or argument.

The problem for discussion is the probable form and sequence of deposits over a region deeply flooded by an approaching but still distant glacier which forced the waters over a still more distant col which was gradually degraded. Every prospector and ore-dresser is well acquainted with the classifying and

sorting powers of streams of varying velocities, and nothing could more plainly show the distance of the glacier and the stagnation of the water than the varying thicknesses of clean sticky clay which universally lie against the rock floor of the region. Where bays to one side of the line of current offered especially still water its thickness runs up to 100 feet. Even on the hillside at Warren near the "old drift" and not far above present water level the writer has found it and taken fragments of wood therefrom. This presence of the broken pieces of the old forest in the clay is proof of a first invasion of the region, and at Bradford, Clarendon, Stoneham and elsewhere outside of the area of discussion the heaps of accumulated logs were so well preserved as to make the driving of the pipe to bed rock a most difficult operation. Even as far down the river as Kittanning this clay is so abundant as to furnish material for the manufacture of china. Above this the sequence of deposits is a fine quicksand resembling a friable clay; a coarser quicksand; sands, and, finally, gravels. Where there was continuous current action the lighter varieties are generally absent, and where it swept along one side of a valley with torrential force even the gravels are absent on that side, as at Warren, Franklin, Brandon, Kennerdell and numerous other places not noted in the many discussions of this region. At Bradford, Stoneham and Clarendon we have the whole series as it was laid down, as shown by the thousand wells of Bradford, the hundreds at Stoneham, and the 1,300 or more of the South Pennsylvania Company about Clarendon.

Regarding the alleged "old gravels" which are supposed to have been laid down in a river bed whose bottom was several hundred feet above present water-level, we find that they vary in level A.T. 100 feet or more within a few miles and around the shoulders of the same hill. Streams never run up hill and so there was no stream deposition at such places.

Coming from generalities to specific localities we find at Bradford, outside of the so-called Kansan area, that the valley for miles has a nearly flat surface, and the rock floor

averages 200 feet below it. Taking the Clarendon-Stoneham-Glade-Warren rock floor of Carll's preglacial stream we find the drive pipes at the first place will run from 200 to 310 feet. The last was located on and ran through Mr. Leverett's "old drift." At Stoneham the average is 200 to 232 feet: at Glade, 100 feet: at Warren, and again on the "old drift" are several wells which place the rock floor on a slope running from present water level to fifty feet below it. The averages of the four localities above given show that the floor dips from Clarendon to Warren and will average 1,200 A.T., or below present water-level. This being the fact, the "old drift" patches are shown to be the youngest of a regular series, and as the rock floor level was determined before deposition began, there has been here no "great erosion." For 60 miles of the valley we can say "no erosion."

At Franklin we find rusty gravel on the hillside north of French Creek. The new water works enabled the writer to inspect a deep trench for the city mains which ran from just above water-level to several hundred feet up the mountain, where the reservoir was being built. As the trench went down to soil rotting in place there was a chance to see the soil line and to note that the sediments were washes parallel thereto, and carrying the same amount and kinds of foreign rocks throughout all elevations exposed. Here also the "old drift" lay on top of the wash, and there was no "erosion."

Parker was made much of, as here was an alleged "abandoned loop" of a mythical Alleghany of Kansan times. The writer showed, more than a dozen years ago in *SCIENCE*, that the wide difference in elevation, material and dip of the deposits precluded their being laid down by a stream, and this was proved by the usual oil well not very far from the Alleghany which went down through the "old drift" to below the present water level.

We have now performed our task, the reference of the "old drift" at Warren, Clarendon, Franklin and Parker to the present water level, and in all these places it lies over the old bottom as the uppermost of a regular

series laid thereon, showing conclusively that the bottom was leveled preglacially and that there has been no "erosion."

In view of these facts, which anybody can check, it is germane to the subject to ask Mr. Leverett to kindly be specific and state exactly where this "great erosion" occurred over the "upper Alleghany region."

EDWARD H. WILLIAMS, JR.

ACADEMIC FREEDOM

TO THE EDITOR OF SCIENCE: The dismissal of Professor Willard C. Fisher from the chair of political and social science at Wesleyan University, which has now been made formal and definitive by the acquiescence of the trustees in the action of the president, is an occurrence that shows the need of constant effort and discussion in order to maintain the right of freedom of speech and of teaching. The correspondence between President Shanklin and Professor Fisher, as published in a recent number of SCIENCE (February 14), is on its face sufficient evidence that a teacher who had served the institution for twenty years was summarily removed on grounds that are absolutely trivial and puerile. From various sources which seem reliable the report comes that Professor Fisher's address at Hartford was not the cause of his dismissal, but that the real ground is to be found in the objection felt by the president and some of the trustees of the college to his political and social views. If this is so, it only emphasizes the fact that there has been a serious infringement of the principle of academic freedom. The matter is too serious to be allowed to drop: it seems desirable that there should be protests from universities, learned societies and individuals so numerous as to arouse public opinion and render any similar occurrence impossible in the future. Physical science has fortunately no longer to fear any direct interference from outside authority. It is a long time since Galileo; and even the doctrine of evolution now calls out no protest from any quarter. But the representatives of these sciences will not fail to recognize that

their own cause is bound up with that of the economists and social philosophers who now furnish the chief grounds of offence to the "interests." For freedom of speech and of research can not be limited to certain subjects: science can not exist half slave and half free. I conclude by quoting an extract from an address of President Schurman as reported in the *Cornell Sun* for September 24, 1897, which seems to me a fine statement of principles of which we should never lose sight.

If it is asserted that the business of the college or university is to teach that which the average man may believe, or that which is acceptable to the university, or that which the board of trustees may assert as the truth, the answer must always be that such a course contravenes the very principle on which the university was founded, and however true it may be that the majority must rule in the body politic, the motto of the university must be, one man with God's truth is a majority. There is also a second principle involved in what has been said if all this be true. It is perfectly clear that every teacher must be free to carry out his inquiries and to announce and proclaim if he wishes what he has observed, or in dealing with the individual student the teacher must be free to present all phases of the question as they occur to him—otherwise he has missed his great vocation as a teacher.

Money is needed by universities. I know it well. I know that our board of trustees is constantly wrestling with the problem of how to make both ends meet, how to meet the legitimate demands of the heads of departments and colleges, yet if money is to be got for the institution by the suppression of the truth, by setting any limitation whatever upon the freedom of the teachers to inquire or to announce the results of their inquiries, better a thousand times that the institution should go out of existence. The end of a university is truth and the promotion of truth. Money may be a means to that end, and as a means it may kindle a great light; as an end it can only produce total darkness. Hence any attempt to set limitations upon the independence of the teaching staff must be resisted, must be unwarranted. We need for the advance of civilization the striking out of new ideas or the application of old ideas to new fields. Where are such ideas to be urged, if the business of the university is to teach what is acceptable to the community? All science would be impossible on this theory.